

WHAT IS CLAIMED IS:

1. An intravascular probe comprising:
 - a sheath having a distal portion and a proximal portion;
 - a first optical waveguide extending along the sheath, the first optical waveguide being configured to carry optical radiation between the distal and proximal portions;
 - a first beam redirector disposed at the distal portion in optical communication with the first optical waveguide;
 - an optical detector configured to receive optical radiation from the first optical waveguide;
 - an ultrasound transducer disposed at the distal portion, the ultrasound transducer being configured to couple ultrasound energy between the intravascular probe and a transmission medium; and
 - a wire extending along the sheath in electrical communication with the ultrasound transducer.
2. The intravascular probe of claim 1, further comprising:
 - a second optical waveguide extending along the sheath, the second optical waveguide being configured to carry optical radiation between the distal and proximal portions;
 - a second beam redirector disposed at the distal portion in optical communication with the second optical waveguide.
3. The intravascular probe of claim 2, wherein the second beam redirector is configured to redirect an axially directed beam of optical radiation incident thereon from the second optical waveguide into a beam propagating along a direction having a radial component.
4. The intravascular probe of claim 2, further comprising an optical source configured to couple optical radiation into the second optical waveguide.
5. An intravascular probe comprising:
 - a sheath having a distal portion and a proximal portion;
 - a first optical waveguide extending along the sheath, the first optical waveguide being configured to carry optical radiation between the distal and proximal portions;

29 a first beam redirector disposed at the distal portion in optical communication with
30 the first optical waveguide;

31 a second optical waveguide extending along the sheath, the second optical waveguide
32 being configured to carry optical radiation between the distal and proximal
33 portions;

34 a second beam redirector disposed at the distal portion in optical communication with
35 the second optical waveguide;

36 an ultrasound transducer disposed at the distal portion, the ultrasound transducer
37 being configured to couple ultrasound energy between the intravascular probe
38 and a transmission medium; and

39 a wire extending along the sheath in electrical communication with the ultrasound
40 transducer.

41 6. The intravascular probe of claim 5, wherein the first beam redirector is configured to
42 redirect an axially directed beam of optical radiation incident thereon from the first optical
43 waveguide into a beam propagating along a direction having a radial component.

44 7. The intravascular probe of claim 5, further comprising an optical detector configured
45 to receive optical radiation from the first optical waveguide.

46 8. The intravascular probe of claim 5, further comprising an optical source configured to
47 couple optical radiation into the first optical waveguide.

48 9. The intravascular probe of claim 8, wherein the optical source is configured to emit
49 infrared radiation.

50 10. The intravascular probe of claim 5, wherein the first optical waveguide comprises an
51 optical fiber.

52 11. The intravascular probe of claim 5, wherein the first beam redirector comprises an
53 optical reflector.

54 12. The intravascular probe of claim 5, wherein the first beam redirector comprises a
55 prism.

56 13. The intravascular probe of claim 5, wherein the first beam redirector comprises a
57 bend in a distal tip of the first optical waveguide.

58 14. The intravascular probe of claim 5, wherein the ultrasound transducer comprises a
59 piezoelectric transducer.

60 15. The intravascular probe of claim 5, wherein the sheath comprises a material that is
61 transparent to infrared radiation.

62 16. The intravascular probe of claim 5, wherein the first beam redirector is rigidly
63 connected to the ultrasound transducer.

64 17. The intravascular probe of claim 5, wherein the first beam redirector is flexibly
65 connected to the ultrasound transducer.

66 18. The intravascular probe of claim 5, wherein the first beam redirector is configured to
67 emit light from a first axial location with respect to a longitudinal axis of the sheath, and the
68 ultrasound transducer is configured to emit ultrasound energy from the first axial location.

69 19. The intravascular probe of claim 5, wherein the first beam redirector is configured to
70 emit light from a first axial location with respect to a longitudinal axis of the sheath, and the
71 ultrasound transducer is configured to emit ultrasound energy from a second axial location
72 different from the first axial location.

73 20. The intravascular probe of claim 5, further comprising a rotatable cable surrounding
74 the first optical waveguide and the wire, the rotatable cable being configured to coaxially
75 rotate the first beam director and the ultrasound transducer.

76 21. The intravascular probe of claim 5, further comprising:
77 a plurality of beam redirectors circumferentially disposed about a longitudinal axis of
78 the sheath;
79 a plurality of optical waveguides in optical communication with the plurality of beam
80 redirectors; and
81 a plurality of ultrasound transducers circumferentially disposed about the longitudinal
82 axis.